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ABSTRACT

Competitiveness is viewed as an umbrella for such concerns as trade and budget deficits, savings and investment rates, real wage growth, productivity growth, and retraining of dislocated workers. The main reason for interest in competitiveness in the United States now, it is suggested, is the recent massive U.S. trade deficit. The view is stressed that higher education should contribute to the national economic development by providing a "higher quality educational product." A recommendation is to contribute via realistically sized tasks that relate directly to the various aspects of the main problem. Higher education can be used to enhance the American workforce's vitality. The idea is to use higher education to provide the economy with more people who have a larger amount of relevant knowledge, and who will help the U.S. economy by designing, generating, and marketing in a far better manner than they do now on the international stage. This will encourage the American economy to request and support more educational enterprise. Specific recommendations are made for improving the undergraduate training of the business and engineering workforces, including stricter science and language requirements and a greater emphasis on verbal skills. It is also suggested that all people working in higher education should engage in continuing education and training, that high school girls be encouraged in the areas of math and science (since statistics show women are establishing small businesses at a much higher rate than men), and that people in occupational associate's degree programs be required to have enough generalist learning to ensure twelfth grade performance in language, math, science, and social science. (SM)

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To Compete or Not Compete:
What Higher Education Can Do While Everyone Else Sorts It Out

by Clifford Adelman*

"Competitiveness," as Senator Bill Bradley frequently notes, is a "mush word" that for all its ambiguity, "is rolling off the lips of everyone in Washington." It is owned by no political party in particular because, as one wag observed, there's no partisan "tailwind" in it. The groups now rallied 'round the flag include the Congressional Caucus on Competitiveness (190 M.C.s and growing), the Council on Competitiveness (a spin-off of the Business/Higher Education Forum), a former Presidential Commission on Competitiveness, and dozens more that have graciously declined to use the word on their stationery.

While an April, 1987 report from the General Accounting Office delicately remarked, there seems to be "some confusion about what the term 'competitiveness' means," 40 years earlier, George Orwell was more blunt in warning about such words. They "do not point to any discoverable object" and "are hardly expected to do so" by a reader or listener. Their use indicates "a reduced state of consciousness," and, indeed, the only waking aspect of "competitiveness" derives from the movement of one's jaw chewing on the phonemes.

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It is in this reduced state of consciousness that higher education leaders have been presented with what Stuart Eizenstadt called "a golden opportunity . . . to put their issue in a broader public policy context," but have responded merely by clothing old (though worthy) funding requests for research facilities, laboratory equipment, and cooperative R&D, in a new slogan. During the 1987 AAHE National Conference in Chicago, a seminar room of us were told that "there is going to be a lot of new money out there on this competitiveness thing, and higher education had better get its act together in order to participate." No consciousness, no reflection. We're going to respond to a specific supply of dollars and a vague demand for services and people.

This article will argue, to the contrary, that higher education's best contribution to national economic development should be the supply of a higher quality educational product--and in quantity--irrespective of dollars and demand, and that the way to think about this contribution is in small, realistic tasks directly related to components of the larger problem.

So let us first disaggregate the problem in order to determine what higher education can practically contribute to the solution, what it is best suited to do <u>on its own terms</u>, and with its own mechanisms. This consciousness and reflection is necessary because the major reports on the "competitiveness" issue to date

have failed to link knowledge content to requirements or standards for degrees, and hence have missed the major potential leverage of higher education in improving the vitality of the American workforce. The hortatory language of the limited number of recommendations to colleges and universities in these reports is dominated by verbs such as "expand," "reemphasize," and "strengthen," none of which expresses concrete actions, and all of which commit the original sin of the impossible five-syllable word itself.

Competitiveness as an Umbrella

We must first recognize that "competitiveness" is an umbrella under which live a host of allied concerns: trade deficits, budget deficits, savings and investment rates, skills of American management, the culture of the workplace, productivity growth, real wage growth, promotion of R&D, protection of intellectual property, and retraining of dislocated workers. These concerns reinforce the disappointing perception that we have become a colonial economy dominated by fast-food services and fast-financial services, owned by foreigners, and dependent on the export of agricultural products and raw materials. The umbrella is really about what would be called "national development" if the U.S. were a newly industrialized country (NIC) like Brazil or South Korea. It's about living up to one's potential as a national economy, with or without the kind of active government

promotion and coordination of private sector development we have witnessed in Japan (consumer electronics) and France (rail and air transport equipment). The indicators of trade, GNP, personal income, capital formation, level of education, volume of original contributions to knowledge and products, etc. together--and not separately--tell the tale.

The Trade Deficit as Proximate Cause

The proximate cause of the current interest in "competitiveness" is the massive U.S. trade deficit of recent years. When they aren't blaming the trade practices of Pacific rim governments or the lack of economic stimuli of European governments, the pundits acknowledge a far more complex set of explanations ranging from monetary issues to export controls to structural differences between U.S. industries and their foreign counterparts.

Would a balanced trade account (or even a surplus) symbolize "competitiveness"? As Lester Thurow points out, the world's poorest country, Bangladesh, has a balanced trade account because wages are so low that exports are competitive--at least in terms of price. But we want to maintain our real wages and standard of living and balance our accounts, and we cannot assume that folks in Canada, Japan, West Germany, and other OECD countries think any differently than we do. When developing nations are added to the list, we should realize that we cannot maintain our past

"share" of world trade when everyone else is growing up. Besides, the vitality of economies in Argentina, Nigeria, and Indonesia is now indispensable to our own.

The point is three-fold. First, as a result of advances in transport, finance, and communications technologies, we are now more a trading world than ever; and it takes two to trade, i.e. the very notion of trade is as much cooperative as it is competitive. Second, that some of the principal causes of the current balance of payments deficit could be corrected in the near term, while the underlying problems of U.S. industry in a trading world would remain. But third, when we analyze those underlying problems in terms of their knowledge-base, we can easily see that higher education is one of the few institutions in our society with the potential to increase dramatically the level of learning and skill in the workforce.

The Paradox of Credentialism

One of the principal "underlying problems" is an unhappy paradox: while the society writ large invests in education, the market system demands and rewards only credentials. In the process, knowledge falls through the cracks. To illustrate: few American corporations provide incentives for their international sales forces to know foreign languages or cultures; most do not require their marketing labor force to know much about science and

technology; and only a handful reward R&D engineers for knowledge of industrial production or aesthetic design. At the same time, though, employers require that all these people possess degrees indicating time spent in higher education.

What do employers think is most necessary to job success? In 1983, Wellford Wilms surveyed 167 Los Angeles area employers in a variety of industries to find out: 63% cited work habits and attitudes; 23% cited technical job skills; but only 14% cited basic academic skills. If we left it up to most employers, then, the knowledge content of work would be rather low. These are the same employers who, instead of restructuring basic manufacturing processes and controlling the development and marketing of new products in the U.S., move existing plants with existing labor technologies to other countries simply to take advantage of cheaper (and less educated) labor.

Given such direction by employers, it is no wonder that college students want jobs, not knowledge, and demand only enough education to get them to those jobs. Too many colleges, community colleges and universities have responded with a supply-side approach that holds scant regard for content. Colleges have been giving students the degrees they want, and think they are contributing to an economy. Unfortunately, it's someone else's economy: the students can assume jobs for which the degree is the minimum credential, and join both the middle class and our

national orgy of credit-card consumption (of Japanese cars, Swedish furniture, French appliances, Taiwanese electronics, and designer jeans made in Hong Kong), without commensurate contributions to the creative or productive capacity of the domestic economy. This is the wrong kind of supply, and, furthermore, does our students no favors.

For the problem known in 1987 as "competitiveness" says clearly that unless there is more knowledge content in the economy (reflected in new U.S.-made products and in reconstruction of production processes), the jobs of today will not be here tomorrow. As the work of the Berkeley Roundtable on the International Economy (BRIE) constantly points out, American manufacturing corporations have not learned very well from their failures in the world marketplace, and American pundits do not aid our understanding of the problem when they use these failures to write off manufacturing and claim that the U.S. can prosper with a universal service economy. As BRIE economists emphasize, no service economy, let alone one dominated by those high-paying jobs our college graduates hanker for, can survive without a vital manufacturing base. Indeed, those higher paying jobs are far more likely to exist in an economy with a significant sector of internationally-oriented industry.

The consequences of the paradox of credentialism in both the labor market and higher education include a declining rate of

innovation and invention in the U.S., and, more seriously, a blockage in the diffusion of innovations. Let us briefly consider each of these indicators.

High Side Indicators of Productivity

Because they generally require a significant investment of intellectual capital, the rates of innovation and invention might be called "high side" indicators of productivity. Using the period, 1973-1982, the 1985 Science Indicators report of the National Science Board tells an unhappy story for the U.S.

The most disturbing trends are the declining rate of foreign citations of U.S. articles in all scientific and technical fields, a 50% decline in the number of external patent applications by U.S. inventors, and a doubling (to nearly 50%) of the percentage of U.S. patents awarded to foreigners. If our knowledge output is less respected (the decline in foreign citations), and if the largest R&D machine in the world is not penetrating the frontiers of invention (the patent trends), we are not realizing our potential.

Low Side Indicators of Productivity

An equal investment--though of a different kind--is required for the diffusion of knowledge and innovations through the mass of

the workforce. Twenty years ago, Everett Rogers' pioneering research indicated that in each occupation, one is more likely to recognize, analyze, and adopt an innovation--whether a product such as a personal computer or a process such as franchising--if one has enough knowledge and language skill to judge and articulate the nature, benefits, costs, etc. of that innovation.

In this light, consider the "low side" indicator (from the National Assessment of Educational Progress) of the 60% of young adults with 2 or 4-year college degrees who can neither produce a valid interpretation of a newspaper editorial nor use a bus schedule (and among those who graduated from high school but did not earn postsecondary degrees, 88% cannot perform these tasks). We are not going anywhere with that paradox of credentials and literacy! Think of the consequences for productivity and trade if a mass of shipping clerks who cannot interpret the array of information in a bus schedule are working in newly-computerized warehouses! This is an example of "blockage" in the diffusion process; and my point is that to the extent to which the mass of a workforce is incapable of using basic technological innovations, the vitality of the entire economy stagnates.

High-side indicators of productivity provide a clear message that content (the concepts, facts, theories, and methodologies of disciplines and fields) makes a difference for those who are already engaged in higher education. Low-side indicators provide

an equally clear message that for the economy to succeed as a whole (and the domestic performance is inseparable from the international performance), competence in basic content (the entry-level collection of concepts, facts, methodologies, etc. of disciplines) as well as in more than basic skills is critical, and more people must be brought to those levels of competence. Both indicators make the case that higher education must perform its core functions more effectively, that we must raise not only our standards of content, but our standards of performance as well.

Where Higher Education Can Best Focus

Lester Thurow recently pointed out that "nobody can build a high quality economy out of low quality components." What Thurow meant by the "components" include "a first class work force, first class equipment, first class research and development, first class management, and first class management-labor relations." More importantly, he stressed that if we are not willing to develop all these components, we are not going to be "competitive in world markets."

Higher education can influence the quality of parts of the labor force, and through those parts, R&D, management, and management-labor relations. But higher education is not the institution best suited for retraining displaced workers, at least not alone

(according to a recent GAO study, only 26% of the Job Training Partnership Act programs for dislocated workers were operated by postsecondary institutions, and their principal activities focused on job information and job-hunting skills, not the acquisition of new knowledge or skills in the classroom), nor is it the institution best equipped to teach the non-college-bound how to use a bus schedule (the military's education and training programs can probably do a much better job with that population).

On which parts of the future labor force should higher education focus? And where is the leverage in each of those areas? Recall the principal theme: if the source of economic dissonance lies in the substitution of time for content and performance as the grounds of educational credentials, then we must increase the knowledge content of degree programs. Since there are over 1100 degree programs in U.S. higher education, and since our energies are finite, I suggest that we stress a few key fields in terms of the workforces they yield: business, engineering, and technical.

Re: The Business Workforce

The coming generation of management has the awesome task of reshaping the way American corporations manufacture and market. Higher education has the responsibility to ensure that this generation has the knowledge and vision sufficient to that task. The challenge is considerable. As Jerilee Grandy's recent study

of SAT test-takers between 1977-1986 demonstrates, among the those who said they intended to major in one of 20 academic fields, the Business Administration cohort placed 20th in high school class rank, 20th in mean SAT/Verbal, 17th in SAT/Quantitative, and 19th in educational aspirations (the proxy here is the percentage intending to receive a graduate degree). Four or six years later, those who majored in Business Administration score at the bottom of the heap on the Graduate Management Admissions Test.

And what do we teach this group? On the one hand, a lot of theory: Theory X and Theory Y (authority), organization of the firm, workforce psychology, systems, strategic planning, decision parameters, leadership. On the other, a lot of method and quantitative decision-making: PERT, CPM, MBO, cost projections, etc. There's little here of the content of either manufacturing or services; and the logical extension of the culture of business education has included computerized program trading on the stock exchanges, a surge in arbitrage, and lots of leveraged buy-outs. We shuffle decks of money. We don't make stuff. As <u>The Economist</u> observed in January, 1987, when American industry turns "its attention from management techniques and financial manipulation towards engineering and design," we'll be more successful. This may be a heavy judgment, but its rhetorical intent is to counter an empirical extreme.

I would make two recommendations designed to enhance the content of undergraduate degrees in Business Administration in light of the above analysis.

(1) A management that is scientifically illiterate, that does not understand engineering and design, cannot realize the connections between R&D, production and marketing. A preliminary analysis of the transcripts of 4400 students in the National Longitudinal Study (high school class of 1972) who received bachelor's degrees within 12 years of high school graduation indicates that business and management majors took fewer credits in science than English or foreign language majors! A similar analysis of those in the High School and Beyond Study (high school class of 1980) who completed the bachelor's degree by 1984 demonstrates that business administration graduates took less science and less math than did their 1972 counterparts. A key link in the relationship between education and technological innovation would be established if graduate schools of business administration required of <u>all</u> applicants for admission four semesters of undergraduate coursework in one of the basic sciences and an additional two semesters in an allied technology

(2) A sales force that is ignorant of both science and foreign languages, affairs and cultures cannot sell U.S. products in a world economy. Sales (or customer-relations) is the entry-level job for the mass of our undergraduates with degrees in Business

Administration, and the American Assembly of Collegiate Schools of Business should improve the knowledge content of those degrees three-fold by setting accreditation standards requiring either the science component indicated in #1 above and/or demonstration of proficiency in a foreign language at a rating of "2" on the Foreign Service Institute scale (and a "2"--out of 5--is very generous). College graduates heading into U.S. corporations in 1987 also ought to possess the knowledge represented in the content domains of the Foreign Service Entrance Examination---which does not require a specialized education, but which requires enough of a general education to negotiate the world.

Re: The Engineering Workforce

In contrast to the cohort of entering Business Administration majors, that in Engineering is a more capable group: 4th in high school class rank, 11th in mean SAT/V, 3rd in mean SAT/Q, and 10th in educational aspirations. On the other end of the baccalaureate pipeline, Engineering majors perform fairly well on professional school admissions tests. Where they slip between matriculation and graduation is on the GRE/Verbal, and that provides a small hint of what is missing in the education of engineers. What two recommendations can we offer to improve the content of undergraduate engineering education in the U.S.?

(1) For the most part, American manufactured products, e.g. kitchen appliances and automobiles, look like boxes, and the

American consumer responds by buying what we call "European" design. Undergraduate engineering programs in appropriate sub-fields should thus require at least two semesters' study of art and design, along with a problem-oriented course that integrates design and technology. Jonathan Warren's recent analysis of the transcripts of 176 Mechanical Engineering graduates from four institutions in 1985-86 indicates that only 10% had any formal coursework in Art, while another 9% had studied product design (and there may be some overlap in those two groups). Engineering design is a composite of function, construction, cost and appearance; and if we find a way to train our engineering workforce in all of them, we may have an impact on the marketability of U.S. products--here and abroad.

(2) In another instance of fragmentation that leads to discontinuities in the product development cycle and a loss of control over products themselves, most R&D engineers are not schooled in industrial processes or marketing. So one set of people develop basic technologies, a second set plans and designs the products, another set of people figures out how to make them, and yet a fourth set of people determines how to market them. What happens too often is that U.S. corporations never make it through all four stages. The VCR is a marvelous though tragic case of our failure to extend an initial technology (the broadcast video-tape recorder) to a product designed for consumers, and then to produce and market it. Schools of Engineering should thus require

both industrial process and marketing courses of graduates in appropriate sub-fields who are heading into R&D.

Both these recommendations would require a higher degree of verbal skill than most undergraduate engineering students possess. The skill would be well-acquired, as a series of British studies conducted in the 1970s demonstrated that engineers spend 41% of their job time in communication tasks.

Adaptability and the Diffusion of Innovations

Three additional recommendations are directed at the higher education of large segments of the workforce, and are designed to improve abilities to recognize, interpret, and adapt to innovations.

(1) As indicated in the NAEP performance data cited above, our generalist model of education is not working, especially for the lower-level technical and service workforces (a significant percentage of which receives their credentials from community colleges). To improve the ability of this workforce to adapt to innovations in the workplace, occupational Associate's degree programs (which cover two-thirds of all 2-year college enrollments) should require whatever is necessary to deliver and document the generalist learning that did not take place previously. To increase the knowledge content of the degree, we must

require sufficient training to ensure 12th grade performance levels in all four language skills, mathematics through intermediate Algebra and Trig, a full year of a laboratory science most appropriate to the occupational field program, and the equivalent amount of a social science appropriate to the field. Preliminary analyses of college transcripts for occupational Associate Degree holders in both the National Longitudinal Study and High School and Beyond indicate that very little of this is going on now.

(2) As Joseph Johnston noted in Educating Managers, not only is small business the premium growth sector in the U.S. economy, but in recent years, women have established these enterprises "at a rate six times faster than men." Small businesses are often critical synapses in the diffusion of innovations, and the more technologically-based those innovations, the more women, in particular, will need appropriate "basic content education" in science and math. This may sound like an old song, and one in a difficult key, as the research demonstrates that women begin to back out of science and math in their early adolescence. While there have been notable institutional efforts to support and encourage young women with high aptitude for science and math, colleges and universities do little for those of average aptitude and interest (including the non-college-bound). This is one area in which colleges must make a very bold move into the high schools through tutorial and support hours for girls in grades 8-10, conducted by female college seniors and graduate students.

Plenty of these college students offer tutorial services to high school students in the open market. But college or university sponsorship, however, can focus their efforts on a particular population and increase their efficiency by having them work with small groups (5-7 students) instead of individuals.

(3) Our higher education system employs nearly 2 million people, a majority of whom have not received sufficient formal education for them to assist in the general process of the diffusion of innovations in the economy. It should be a condition of employment that the entire higher education workforce be engaged in continuing education or training, and it is our obligation to provide it as a standard benefit. We may lose some of these workers because of the knowledge and skills we help them gain, but we must take the same risks as other major employers in that regard.

* * *

These recommendations are intended to be suggestive, not exhaustive. I do not pretend that these steps, individually or collectively, will solve the "competitiveness" problem; I do not pretend that the connection between basic science, technology and product development and marketing is as direct as some of these steps imply; and I am fully aware that the dominant tenor of these recommendations smacks of the academic's reflex "add-a--

course" solution to any reform issue. But remember that academic time is finite, that more of x means less of y, and that, as all our current transcript studies indicate, there is plenty of unproductive "y" lying around.

As Lester Thurow says, you can't get quality with mirrors: you have to "work harder," and "that is how the rest of the world did it." This notion is hardly incompatible with the theme of Involvement in Learning, the first (1984) of the recent spate of reports on the quality of higher education. But the basic contention behind these recommendations is that if higher education supplies the economy with more people with a greater degree of relevant knowledge, those people, in turn, will ensure not only that U.S. firms design, produce, and market on an international stage far better than they do now, but that our economy will demand--and support--an ever-expanding educational enterprise.